ENERGY STAR[7] Set-top Box Program
Final Specification
Version 4.0
May 25, 2000

The symbol for energy efficiency.

Below is the final product specification for the ENERGY STAR Set-top Box Program. Per the requirements of the ENERGY STAR Program, a product must meet all of the identified criteria if it is to be qualified as ENERGY STAR compliant by its manufacturer.

1) Definitions: Below is a brief description of a set-top box and its common operational modes as relevant to the ENERGY STAR Program. The ENERGY STAR specification focuses on reducing energy consumption while the product is in the Standby/Low-power Mode.

   A. Set-top Box: A commercially available electronic product encased in a single housing whose purpose is to receive, send, process, translate, and/or record signals that are then sent to a television or similar display device for viewing or to a computer for processing. Products currently covered under the TV/VCR and Home Audio/DVD Agreements are not eligible to qualify for the ENERGY STAR label under the Set-top Box Program. As the TV/VCR and Home Audio/DVD specifications are revised, EPA will make a concerted effort to coordinate and/or consolidate, as appropriate, the energy-efficiency specifications across the TV/VCR, Home Audio/DVD, and Set-top Box Programs.

   B. Standby/Low-power Mode: The lowest power state that the set-top box product model enters while connected to a power source. In this mode, the product appears to be "OFF" to the user, but may be capable of responding to a signal (e.g., a signal sent from a head end or data provider) and may continue to perform some functions (e.g., remote control sensing, time readout, and hard drive spinning). If the product is designed for a network environment, then it must retain network connectivity (e.g., communication with a head end or service provider) and the ability to wake up from a remote source in the standby/low-power mode. The manufacturer must ensure that the energy-saving features or design of the ENERGY STAR compliant product do not interfere with or adversely impact the performance of the product.

EPA Comments : Please note that the standby/low-power mode defined above differs from the standby mode defined for the TV/VCR and Home Audio/DVD Programs. According to industry, the "traditional" standby mode provided in the TV/VCR and Home Audio/DVD Programs is not currently applicable to all types of set-top boxes. Hence, the standby/low-power mode definition is fairly general and does not dictate product requirements in recognition that different boxes may perform different functions when turned "OFF." For additional information, please refer to the EPA Comment Box following Definitions on page 2.

   C. Active Mode: The mode in which the product has been turned "ON" by the user. The product is connected to a power source and is receiving, sending, processing, translating, and/or recording signals. The power requirement in this mode is typically greater than the power requirement in standby/low-power mode.

   D. Disconnect: The mode in which the product is disconnected from all external power sources.

EPA Comments : Above are brief descriptions of common operational modes for set-top boxes that EPA has observed in field tests conducted by/for EPA. To achieve the maximum energy savings without compromising performance, the ENERGY STAR specification focuses on standby/low-power mode, which was the consensus at the July 1999 meeting between EPA and set-top box industry representatives. (See www.energystar.gov for list of attendees.) EPA has purposefully avoided defining various standby/low-power modes based on the functionality provided in each mode (e.g., standby-passive, standby-active, etc.) for two reasons: 1) recognition of the variation in modes and functionality across product categories, and 2) desire to encourage simplicity in program design and implementation.

2) Qualifying Products: For the purposes of this Program, set-top box products include the following: analog cable TV set-top boxes, advanced analog cable TV set-top boxes, digital TV converter set-top boxes, Internet access devices, video game consoles, videophone set-top boxes, set-top boxes with cable modems, digital cable TV set-top boxes, satellite TV set-top boxes, wireless TV set-top boxes (e.g., MMDS and LMDS), personal video recorders (e.g., TiVo and Replay TV), and multifunction devices. For the purposes of this Program, a multifunction device is defined as a physically integrated device that has the core function of a satellite TV set-top box, digital cable TV set-top box, wireless TV set-top box, or personal video recorder plus one or more additional functionalities, such as an Internet access device or video game console.

EPA Comments : EPA's interest in developing energy-efficiency guidelines for set-top boxes is driven by the following factors: 1) the identification of products with a large and growing installed base; 2) expectations of significant market growth; 3) evidence of considerable energy use by these products when consumers believe they are off; 4) the potential for more energy-efficient design that does not compromise performance, based on engineering analysis and manufacturer feedback; and 5) changing distribution and usage patterns that will provide consumers with more opportunities to choose energy-efficient models.

Given that these products share many common design characteristics and it is administratively more efficient to maintain one versus several ENERGY STAR Programs, EPA will cover a variety of products under one Set-top Box Program.

In Version 4.0, multimedia device has been replaced with multifunction device. A new specification for multifunction devices, as defined above, is provided in Section 3.

3) Energy-Efficiency Specifications for Qualifying Products: Only those products listed in Section 2 that meet the specifications outlined in Table 1 below may qualify as ENERGY STAR compliant.

Table 1: FINAL Energy-Efficiency Criteria for ENERGY STAR Compliant Set-top Boxes

Product Category	**Tier 1: Standby/Low-power Mode**	**Tier 2: Standby/Low-power Mode**
Category 1 • Analog Cable TV Set-top Box • Advanced Analog Cable TV Set-top Box • Digital TV Converter Set-top Box • Internet Access Device • Video Game Console • Videophone Set-top Box • Set-top Box (e.g., Internet access device) with Cable Modem for enhanced communications in standby/low-power mode	# 3 Watts	One specification for all set-top boxes: # 7 Watts (including antenna in satellite systems)
Category 2 • Digital Cable TV Set-top Box • Satellite TV Set-top Box (single LNB)* • Wireless TV Set-top Box • Personal Video Recorder	# 15 Watts (including antenna in satellite systems)	
Category 3 • Multifunction Device (i.e., a physically integrated device that has the core function of a satellite TV set-top box, digital cable TV set-top box, wireless TV set-top box, or personal video recorder plus one or more additional functionalities, such as an Internet access device or video game console) • Satellite TV Set-top Box (dual LNB with one receiver)	# 20 Watts (including antenna in satellite systems)	

***NOTE**: For satellite TV set-top box models sold with a *dual LNB and two receivers*, multiply the ENERGY STAR specification by two (e.g., # 30 Watts for Tier 1 and # 14 Watts for Tier 2). For satellite TV set-top box models sold with a *dual LNB and one receiver*, see Category 3 in table above.

EPA Comments: Version 4.0 includes a few significant revisions based on industry comments and suggestions. Specifically, EPA has made the following additions and modifications:

- *The specification has been revised to provide an additional wattage allowance for satellite TV set-top box models with more than one LNB or receiver. See Note and Category 3 above. EPA is including the antenna in the specification because the antenna is an integral part of the satellite system and its power consumption. However, EPA recognizes that some models are sold with multiple LNBs and receivers, which require more than 15 Watts in Standby/Low-power Mode, and has modified the specification accordingly.*
- *Similar to industry's proposal, a new category for multifunction devices with a specification of 20 Watts or less has been developed. EPA strongly believes that one specification is preferable to the 50% allowance proposal made by EIA/CEA because it will be easier to administer and potentially less confusing to consumers and retailers.*

Please note that the primary objective of the ENERGY STAR Programs is to recognize the most energy-efficient products in the market through the use of the ENERGY STAR label—a label well known by consumers and large purchasers as the symbol for energy efficiency. It is not EPA's intention to design a specification that will allow every model to qualify for the label. EPA believes that this final specification will recognize a reasonable sub-set of the marketplace.

4) Power Measurement: The power requirement shall be measured from the outlet or power supply source to the product under test. The product manufacturer (i.e., ENERGY STAR Partner) shall measure the average true power (in Watts) of the product. When performing measurements to self-certify a product model, the products under test must be in the condition (e.g., configuration and settings) shipped to the customer. In addition, if a product is designed for a network environment, it must be tested while connected to the network to ensure that all power consumption and performance criteria are met. The test method to be used by manufacturers to self-certify their product(s) for ENERGY STAR compliance will likely be consistent with the Testing Guidelines for the ENERGY STAR® Home Electronics Program. Manufacturers are invited to provide comments and/or suggestions on the test method.

EPA Comments : The draft Test Method is attached for your review and comment. Please note that the time period for testing an individual device is based on the power consumption profile in Standby/Low-power Mode. Example: If the device under test has modes that put it in a low-power state for 4 hours and a higher power state for 1 hour, than an average over 5 hours will be sufficient to capture the true average power consumption of the device.

5) Other Information: The *final* version of the ENERGY STAR Set-top Box Agreement will include additional information describing the goals and key components of the ENERGY STAR Program as well as the Partner requirements. In addition to product specifications, other issues will be addressed, such as the following:

- Buyer Information: In keeping with the spirit of the ENERGY STAR Program, the Partner will be expected to ensure that consumers have a quick and easy method of determining which of its products are ENERGY STAR compliant. To achieve this goal, EPA recommends that the Partner place the ENERGY STAR logo on all qualified product models, their packaging, and product-related materials such as brochures, manuals, advertisements, and Web sites. Further, to educate consumers about energy efficiency and its benefits, the Partner will provide one or more of the following: a description of the ENERGY STAR Program, a discussion of the energy-saving characteristics of the product, a description of the environmental benefits that result from the energy saved by the product, and/or a description of the potential energy-bill savings of the product. The Partner may determine the best manner to disseminate this educational information to customers (e.g., Web sites and brochures) such that it complements the Partner's existing strategy for promotional and informational materials. For example, one manufacturer included the following text in a recent product brochure:

  > "Even when your televisions are "off" they drain power. According to the U.S. Environmental Protection Agency, an ENERGY STAR–labeled TV consumes up to 75% less energy than the average TV when switched off. The ENERGY STAR label, a symbol for energy efficiency, was created by the U.S. Department of Energy and the U.S. Environmental Protection Agency to help identify products that can save money and protect the environment by saving energy."

  Upon request, EPA will review text prepared by Partners to ensure accuracy prior to printing and/or distribution.

- Effective Date: The date that manufacturers may begin to qualify products as ENERGY STAR compliant will be defined as the *effective date* of the Agreement. Similar to the other ENERGY STAR Home Electronics Programs, a manufacturer has **two years** after signing the Partnership Agreement to ensure that the ENERGY STAR label appears directly on at least one ENERGY STAR compliant set-top box model.

  1. Tier 1

  The first phase of this program, Tier 1, shall commence on January 1, 2001 and conclude on December 31, 2003. Upon signing the Agreement, the Partner may begin to use the ENERGY STAR logo on product models, packaging, or other product-related materials that meet the Tier 1 specification. Marketing and promotional activities in support of this program (e.g., program launch) will be conducted by EPA, with assistance from Partners and the Electronics Industry Alliance/Consumer Electronics Association (EIA/CEA), at the 2001 Consumer Electronics Show (CES7).

  2. Tier 2

  The second phase of this program, Tier 2, shall commence on January 1, 2004. The specification for Tier 2 shall apply to products that the Partner begins to ship after December 31, 2003. However, once an individual product model is qualified by the Partner as ENERGY STAR compliant, the model, packaging, or other product-related materials may continue to bear the ENERGY STAR logo until the model is phased out of the market (i.e., the Tier 2 specification will not apply retroactively to models previously qualified under the Tier 1 specification).

- Future Specification Revisions: EPA reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions. EPA believes that new technologies are already available to further reduce standby/low-power mode power requirements in set-top boxes and that future levels will be consistent with those levels recently negotiated for other home electronics.

EPA Comments: ***EPA concurs with industry that it's very difficult to predict what the set-top box market will look like in three years since it is developing and changing so rapidly. Nonetheless, EPA has provided a Tier 2 specification to serve as an "energy-efficiency roadmap" for manufacturers. As the Tier 2 effective date nears, EPA will evaluate the specification and entertain alterations to the specification and product classifications, as appropriate.***

In order to focus EPA/industry discussions on the most crucial elements of the Program (i.e., the definitions and energy-efficiency criteria), EPA has provided this brief specification as opposed to a complete agreement. However, the draft and final versions of the Set-top Box Agreement will have many of the standard sections of an ENERGY STAR Partnership Agreement.

As always, EPA welcomes comments or alternative proposals from industry that address the issues in this Final Specification. EPA considers industry feedback crucial to the successful development of ENERGY STAR Programs.